Dawood Ahmad // Team Second Report

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Introduction

The intent for this experiment was to capture sand behaving as a fluid or what is known as a fluidized bed. The most difficult part of this experiment was the setup, as no previous team has tried this experiment before. So, our references regarding the setup were limited. However, after multiple tries, hard work and not so satisfying results, we managed to achieve the best result out of the setup, and multiple iterations were performed and recorded.

Setup

The setup of the experiment consisted of fine grain general purpose sand, clear plastic tubing, a clear plastic box and an air compressor. Holes equally spaced were created throughout the plastic tubing so the air can flow through. The plastic tubing was placed on a level surface inside the plastic box and at the end of the plastic tubing a compressor is connected. The sand is then placed to fill the plastic box and the compressor is turned on. Air from the tube will then displace the sand and create the fluid like behavior. A diagram of the setup is shown in Figure1

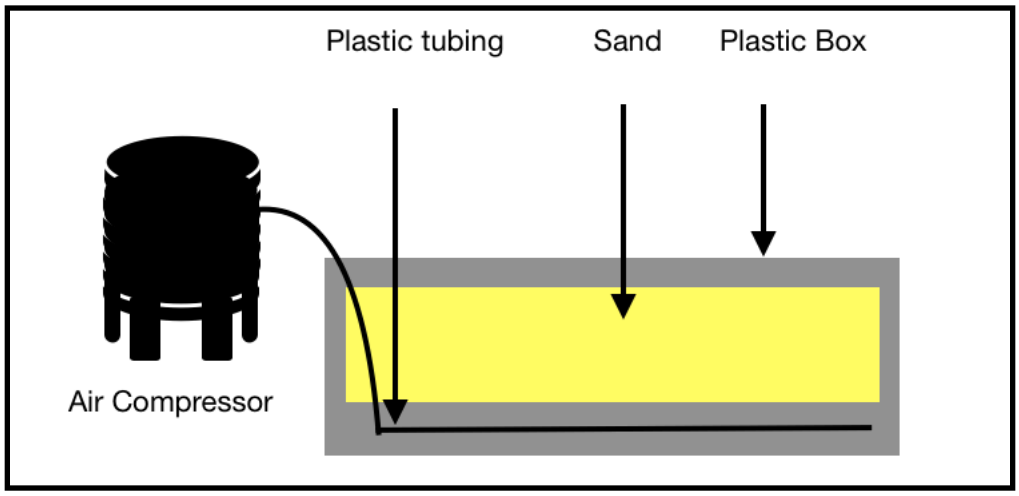

Figure 1. Side view of the setup

Flow Science

The phenomenon that was captured is called a fluidized bed. The phenomenon happens when some quantity of a solid is mixed with a pressurized fluid. The result is a fluid behavior from the solid and fluid mixture. The interesting thing is that the mixture will exhibit behaviors like free flowing under gravity [1].

Camera settings

The camera used was a Nikon D3300 with pixel size 1920×1080. The camera was roughly 2.5” from the side of the plastic tube. The video was shot at 60 frames per second

Edited video

The original video was edited using the Mac editing software iMovie. A video stabilizing of 33% was applied. The contrast and shadows were changed to make the sand color look more realistic as the lighting was poor when the video was taken. The stabilizing option cropped the video and reduced the resolution to 1280x720. Music was added to the video from the artist Ann Annie.

Conclusion

The experiment was definitely a challenge to setup. However when the setup finally worked, the beauty of the phenomenon was rewarding. Personally, I like how the three streams look like candle flames. I Also like it when the air builds up and suddenly bursts to the surface. I feel that we could have done a better job with the lighting. I also wish I was more experienced with video editing as I feel the video looks a little grainy due to heavy color changes in post editing.

Citations

[1] Fluidized bed. (2019, August 22). Retrieved from https://en.wikipedia.org/wiki/Fluidized_bed.